REMARKS

Claims 1-34 were originally pending in the present invention. Claim 34 has been cancelled herein. Thus the pending claims are now 1-33.

The present invention relates generally to any plating solution and methods for monitoring its performance. More specifically, the present invention relates to plating bath and methods for monitoring its plating functionality based on chemometric analysis of voltammetric data obtained for these baths. More particularly, the method of the present invention relates to application of numerous chemometric techniques to describe quantitatively plating bath functionality in order to maintain its proper performance.

Allowable Subject Matter

Claims 18-25 are merely objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. These claims have been amended accordingly and should now be passed to allowance.

Claim Objections

Claim 17 objected to because of the following informalities: "well performance" should be -- well known performance --. This claim has been amended as requested.

Claims 6, 8, 9, and 11 are objected to because of the following informalities: "of one or metal" should be -- of one or more metals --. These claims have been amended as requested.

Claim Rejections - 35 U.S.C. §112, 2nd Paragraph

Claims 30 and 31 recite the limitation "said plating solution" in line 1 of the claim. These claims have been amended to correct this error.

Claim Rejections - 35 U.S.C. §102

Claims 1-2, 5, 12, 16-17, 26-28, 30, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Manwaring, entitled "THE USE OF AN ARTIFICIAL NEURAL NETWORK TO IMPROVE PRECISION IN TRACE LEVEL, QUANTITATIVE ANALYSIS OF HEAVY METAL POLLUTANTS", 1995.

Regarding claim 1:

1.   A process to produce a predictive data set which can be used to predict the property of a plating solution, said process comprising:

(a)   obtaining a sample set, wherein each sample comprises a plating solution of good performance;

(b)   obtaining an electroanalytical response for each said sample to produce a electroanalytical response data set;

(c)   obtaining a training set that comprises said sample set and corresponding said electroanalytical response data set;

(d)   analyzing said training set using decomposition method coupled with discriminant analysis method to produce a discriminant parameters data set; and

(e)   validating said training data set to produce said predictive data set for a predictive model.

It is axiomatic that for a cited document to constitute an anticipation, all of the material elements of a claim must be found in the cited document. See for example, *In re Marshall*, 577 F.2d 301, 198 USPQ 344 (CCPA 1978); and *In re Kalm*, 378 F.2d 959, 154 USPQ 10 (CCPA 1967).

As reaffirmed by the Court of Appeals for the Federal Circuit in *Kalman v. Kimberly Clark Corp.*, 713 F.2d 760 at 771, 218 USPQ 781 at 789 (Fed. Cir. 1983), *cert. denied*, 104 S.Ct. 1284 (1984):

> A party asserting that a patent claim is anticipated under 35 U.S.C. §102 must demonstrate, among other things, identity of invention. In cases like this, identity of invention is a question of fact . . . and one who seeks such a finding must show that each element of the claim in issue is found, either expressly described or under principles of inherency, in a single prior art reference, or that the claimed invention was previously known or embodied in a single prior art device or practice.

(citations omitted)

Manwaring does not teach each and every element recited in Claims 1-2, 5, 12, 16-17, 26-28, 30, and 34, and thus fails to anticipate the claims.

Applicants appreciate the fact that the Examiner asserts that trace metal pollutants are a property of metal plating solutions. However, the Examiner's assertion is incorrect. Unlike river water, which is predominantly water, plating solutions are very controlled, typically very complex chemical environments – which are usually aqueous based. However, while river water may contain small levels of contaminants (ppm or ppb), the complex chemical environment of a plating solution contains much higher levels of multiple chemicals – designed to cooperate in the bath to provide the desired plating. It

is the plating chemicals themselves that require monitoring, not water containing trace pollutants. In contrast thereto, Manwaring was simply studying "river water" for environmental heavy metal pollutants using an electrochemical method known as Differential Pulse Anodic Stripping Voltammetry (DPASV). The paper has nothing to do with the process defined by the rejected claims. See, for example, Claim 1, which is defined by the preamble – which gives life and meaning to the claimed steps – namely, as being directed to "a process to produce a predictive data set which can be used to predict the property of a plating solution..." Reconsideration and withdrawal of this rejection is respectfully requested.

Claim 34 is rejected under 35 U.S.C. 102(b) as being anticipated by Naidu et al., "Use of Neural Networks for Sensor Failure Detection in a Control System", 1990. This claim has been cancelled, and thus this rejection is moot.

Claim Rejections - 35 U.S.C. §103

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Wong et al., entitled "Metallization by plating for high-performance multichip modules", available at:

(http://www.research.ibm.com/journal/rd/425/wong.html), 1998.

Applicant respectfully traverses the rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to

> one of ordinary skill in the art, to modify the reference or to
> combine reference teachings. Second, there must be a reasonable
> expectation of success. Finally, the prior art reference (or
> references when combined) must teach or suggest all the claim
> limitations. The teaching or suggestion to make the claimed
> combination and the reasonable expectation of success must both
> be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

At best, the proposed combination of art might provide the skilled artisan with an "obvious to try" method – not a truly obvious method. As stated in the Federal Circuit case *In re Eli Lilly & Co.*, 902 F.2d 943, 945, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990):

> "An 'obvious-to-try' situation exists when a general
> disclosure may pique the scientist's curiosity, such that
> further investigation might be done as a result of the
> disclosure, but the disclosure itself does not contain a
> sufficient teaching of how to obtain the desired result, or
> that the claimed result would be obtained if certain
> directions were pursued."

Regarding claim 3:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said property comprises an overall plating performance. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or

Claim 3.

The addition of the teachings of Wong et al., does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 3 should be reconsidered and withdrawn. Such action is respectfully requested.

Regarding claim 4:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said property comprises an overall plating performance. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 4.

The addition of the teachings of Wong et al., does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 4 should be reconsidered and withdrawn. Such action is respectfully requested.

Claims 7, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Koslov et al. (USPN 6391477 B1).

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or

references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed

combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 7:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said property comprises an overall plating performance. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 7.

The addition of the teachings of Koslov et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 7 should be reconsidered and withdrawn. Such action is respectfully requested.

Regarding claim 8:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said property comprises an overall plating performance. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 8.

The addition of the teachings of Koslov et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 8 should be reconsidered and withdrawn. Such action is respectfully requested.

Regarding claim 9:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said property comprises an overall plating performance. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 9.

The addition of the teachings of Koslov et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 9 should be reconsidered and withdrawn. Such action is respectfully requested.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Jordanov et al., "A study of the morphological aspects of the indium electrorefining process", 2001, J. Serb. Chem. Soc . 66 (11-12) 913-921 (2001).

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or

references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed

combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 10:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said plating solution is selected from the group consisting of: an electrowinning bath; an electrorefining bath; an electropolishing bath; an electroforming bath; or an electromicromachining bath. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 10.

The addition of the teachings of Jordanov et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 10 should be reconsidered and withdrawn. Such action is respectfully requested.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Simpson et al., "Metamodels for Computer-based Engineering Design: Survey and recommendations", 2001.

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 13:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein the sample data set of step (a) is obtained by design of experiment (DOE) routines. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 13.

The addition of the teachings of Simpson et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 13 should be reconsidered and withdrawn. Such action is respectfully requested.

Regarding claim 14:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein the sample data set of step (a) is obtained by design of experiment (DOE) routines. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 14.

The addition of the teachings of Simpson et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 14 should be reconsidered and withdrawn. Such action is respectfully requested. Regarding claim 15:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein the sample data set of step (a) is obtained by design of experiment (DOE) routines. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 15.

The addition of the teachings of Simpson et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 15 should be reconsidered and withdrawn. Such action is respectfully requested.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Ormoneit et al., "Learning and Tracking Human Motion Using Functional Analysis", 2000.

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 29:

As admitted by the Examiner, Manwaring does not teach the process according to claim 1, wherein said decomposition method of step (d) is selected from the group of: Principal Component Analysis (PCA); calculation of Mahalanobis Distance (MD); calculation of Mahalanobis Distance with residuals (MDR); calculation by Simple Modeling of Class Analogy (SIMCA); calculation of F^s ratio; internal validation; external validation; an combinations thereof. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 29.

The addition of the teachings of Ormoneit et al. does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 29 should be reconsidered and withdrawn. Such action is respectfully requested.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Battaglia, "Regression-Based Statistical Process Control", 1993.

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 31:

As admitted by the Examiner, Manwaring does not teach the process according to claim 31, wherein step (a7) calls for specifying the limits of good and faulty performance of said plating solution; or step (b5) calls for qualifying said unknown samples as correct or faulty. In fact, as discussed above, Manwaring does not teach anything related to the

method of Claim 1 or Claim 31.

The addition of the teachings of Battaglia does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 31 should be reconsidered and withdrawn. Such action is respectfully requested.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of Plotech, "Manufacturing Process Standardization", 2001.

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claim 32:

As admitted by the Examiner, Manwaring does not teach the process according to claim 32, wherein step (a7) calls for defining the limits of said property for said plating solution that requires feed and bleed procedure; or step (b5) calls for qualifying said unknown samples as a ready or not ready solution for feed and bleed procedure. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 32.

The addition of the teachings of Plotech does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 32 should be reconsidered and withdrawn. Such action is respectfully requested.

Claims 6, 11, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manwaring in view of N.C. Division of Pollution Prevention and Environmental Assistance (NCDPPEA), "Metal Finishing Industry, Chapter: Pollution Prevention in the Plating Process", July 11, 2002.

Applicant respectfully traverses this rejection as failing to set forth a *prima facie* case of obviousness. A *prima facie* case of obviousness requires three showings:

> First, there must be some suggestion or motivation, either in the
> references themselves or in the knowledge generally available to
> one of ordinary skill in the art, to modify the reference or to
> combine reference teachings. Second, there must be a reasonable
> expectation of success. Finally, the prior art reference (or
> references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed

combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure.

Manual of Patent Examining Procedure, 8th ed., § 2142. These requirements of a *prima facie* case of obviousness are not met for any of the following rejections under 35 U.S.C. § 103(a).

Regarding claims 6 and 11:

As admitted by the Examiner, Manwaring does not teach a process of claims 1 or 10, wherein said electroplating bath comprises a plating bath of one or metal selected from the following group: Cu, Sn, Pb, Zn, Ni, Ag, Cd, Co, Cr, and/or their alloys. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1 or Claim 10.

The addition of the teachings of NCDPPEA does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claims 6 and 11 should be reconsidered and withdrawn. Such action is respectfully requested.

Regarding claim 33:

As admitted by the Examiner, Manwaring does not teach the process according to claim 33, wherein step (a7) calls for defining the limits of said property for said plating solution that requires feed and bleed procedure; or step (b5) calls for qualifying said unknown samples as a ready or not ready solution for feed and bleed procedure. In fact, as discussed above, Manwaring does not teach anything related to the method of Claim 1

or Claim 33.

The addition of the teachings of NCDPPEA does not overcome the deficiencies of the primary reference. Accordingly, the Section 103 rejection of Claim 33 should be reconsidered and withdrawn. Such action is respectfully requested.

Applicant submits that the claims discussed herein are now in condition for allowance.

PETITION FOR EXTENSION OF TIME

Applicant hereby requests a one-month extension of time be granted for this submission. The original due date was April 30, 2006. The extended due date is May 30, 2006.

FEE AUTHORIZATION

Please charge all fees due in connection with this filing to Deposit Account No. 19-0733.

Respectfully submitted,

/Ernest V. Linek/

_____

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Document No. 123659